

The Bees of the Rocky Mountain National Park (Hymenop.).

By T. D. A. COCKERELL, Boulder, Colorado.

A large area in the most beautiful and interesting part of the Colorado Rocky Mountains has recently been set aside as a National Park. To this playground come many thousands of people every summer to enjoy the relatively cool climate, the mountain scenery, the plant and animal life. Mr. Enos Mills, of Longs Peak Inn, has written a number of excellent popular books, describing the country and giving his observations on the habits of bears, beavers and other animals. He has tried for many years to stimulate an intelligent interest in nature, while at the same time curbing that spirit of destruction which leads people to shoot the animals and pull up plants in a wholesale and reckless manner. Occasionally someone breaks the rules, but on the whole the behavior of visitors to the Park, at least in the vicinity of Longs Peak Inn, is excellent. The multitude, coming primarily for rest and recreation, finds itself in a new kind of school, where fresh impressions and ideas are received every hour. One must be extraordinarily dull not to return from such a holiday with new intellectual interests as well as increased physical vigor. The Park is new, and awaits development in various directions. One of the principal items on the program should be a Natural History Survey. The intensive and scientific study of such an area would produce results of the greatest interest to all biologists, and would make possible many interpretations of natural phenomena instructive to ordinary non-scientific visitors. The indiscriminate collecting of specimens should not be encouraged, but materials must be gathered in a systematic manner to determine the character and distribution of the biota. We should have a committee or commission to carry on the undertaking after the manner of the Clare Island Survey, the results of which have been published by the Royal Irish Academy. Following the technical investigations, the general results and more interesting

details should be re-interpreted in popular fashion for the use of the average citizen.

In the course of a week in the Park, during July, 1919, my wife and I collected bees. The series obtained evidently represents only a minority of the species actually existing in the area, but is worth recording. The names of the localities are abbreviated as follows:

(1) Canadian Zone.

L.—Long's Peak Inn. July 19 and 21.

T. S.—Twin Sisters Mountain, directly east of Long's Peak Inn. All the collecting was done on the lower slopes, in the Canadian Zone, July 23.*

L. P. T.—Long's Peak trail, July 18. Most of the collecting was done in the Canadian Zone, but a few specimens probably were from the Hudsonian.

(2) Hudsonian Zone.

H—Hudsonian Zone on Long's Peak trail, July 22.

(3) Arctic-alpine Zone.

T. L.—Just above timber line on the Long's Peak trail, July 20. The two species from *Pentstemon* flowers were at timber line.

B.—Battle Mountain, well above timber line, July 20.

COLLETIDAE.

Colletes kincaidii Ckll. L., one ♂.

Colletes sp. L., one ♂.

Colletes sp. L., one ♀. This and the preceding are apparently new, but they may have been described in Professor Swenk's revision, not yet published.

PROSOPIDIDAE.

Prosopis personatella Ckll. L., 2 ♀.

Prosopis varifrons Cress. L., 2 ♂. H, 1 ♂, 4 ♀. L. P. T., 1 ♂.

Prosopis tridentula Ckll. L. P. T., 1 ♂.

Prosopis coloradensis Ckll. L., 2 ♀. These are considerably larger and more robust than *P. tuer-tonis* Ckll., generally considered to be the female of *coloradensis*. Possibly *tuer-tonis* is distinct after all, but I cannot assert this at present.

* On Twin Sisters, in an aspen grove, I took several specimens of the Tipulid fly *Ormosia cockerelli* (det. Alexander), a little yellow species described by Coquillett under *Rhypholophus* in 1901, from a single specimen which I took in the Hudsonian Zone in New Mexico. Mr. Alexander had never seen any but the type.

ANDRENIDAE.

Andrena birtwelli Ckll. T. S., 1 ♀ at *Potentilla*.

Andrena lewisii Ckll. T. S., 1 ♀ at *Rosa*.

Andrena moesticolor Vier. & Ckll. L. P. T., at *Potentilla*, 1 ♂.

Andrena apacheorum Ckll. L., 1 ♀, 1 ♂. L. P. T., 3 ♂, at *Erigeron* and *Senecio*.

Andrena topazana Ckll. L., 1 ♀, July 19, the dorsal pubescence gone and wings tattered.

Sphecodes eustictus Ckll. L., 5 ♀. T. S., 1 ♀. H., 1 ♀. T. L., 1 ♀. This species has remarkable altitudinal range; it was described from the lower part of the Transition Zone.

Sphecodes millsii n. sp.

♂. Length about 7 mm.; head and thorax black, with silvery white hair, dense on face; apical half of mandibles red; legs black, with the knees, fore tibiae except a large mark on outer side, apices of middle and hind tibiae, and all the tarsi, clear ferruginous; antennae long, moniliform, the flagellum dull testaceous beneath; second and third joints equal, and combined almost as long as fourth; mesothorax and scutellum highly polished, with sparse but distinct punctures; area of metathorax large, semilunar, covered with coarse vermiform rugae; posterior truncation very coarsely punctured; tegulae dark reddish brown; wings hyaline, stigma and nervures fusco-ferruginous; third submarginal cell very large, broad above; spurs pale ferruginous; abdomen elongate, smooth and highly polished; first segment black with apical margin broadly red; second and third red with a broad black band, suffusedly interrupted laterally; fourth black with apical margin broadly red; fifth black, as also sixth; apical plate red.

Longs Peak Inn, on an umbelliferous flower, July 21 (*Cockerell*). Named after Enos Mills. Allied to *S. clematidis* Rob., but larger, with the abdomen differently marked. From *S. sulcatulus* Ckll. it is easily known by the largely red legs.

Halictus lerouxii Lepel. T. S., 1 ♂ at *Oreocarya virgata*.

Halictus galpinsiae Ckll. T. L., 1 ♂. I was astonished to find this at such an altitude.

Halictus virgatellus Ckll. L., 1 ♂. The male is new, and is determined as this species because it has the characters to be expected in male *virgatellus*. It differs from *H. typographicus* Ckll. by the entirely dark antennae, grayish wings and much darker stigma.

Halictus pruinosisiformis Crawf. L., 1 ♀.

Halictus peraltus Ckll. L., 1 ♂, July 19 (*W. P. C.*).

Halictus nigricalis Vachel. L., 1 ♂. The tubercles have a small inconspicuous pale spot posteriorly.

Halictus peralpinus n. sp.

♀. Length about 6.5 mm., anterior wing 5.4 mm.; black, including legs, but the flagellum with a light fulvous streak beneath, not reaching base or apex; hair of head and thorax scanty, sordid white; head longer than broad; mandibles reddened at apex; lower part of clypeus shining, upper part dull; supraclypeal area shining; front dull, the whole surface minutely sculptured between the punctures; mesothorax dull, with very fine punctures, and the surface lineolately sculptured between; area of metathorax very finely and delicately wrinkled; tegulae piceous; wings dusky hyaline, stigma reddish brown; hind spur pectinate with few spines; abdomen shining, not banded, hind margins of segments brownish.

Longs Peak trail, Colorado, above timber line, July 20, 1919 (*Wilmatte P. Cockerell*).

Differs: (*a*) from *divergens* Lovell by the larger, broader head, dull mesothorax, and absence of distinct white hair-patches on abdomen; (*b*) from *dasiphorae* Ckll. by the dull mesothorax, without punctures distinctly visible under a lens, and the pale streak on flagellum; (*c*) from *inconditus* Ckll. by the dull mesothorax.

Halictus supranitens n. sp.

♀. Length about 6 mm., anterior wing about 5.3 mm.; black, including legs and antennae, apical half of mandibles reddened; hair of head and thorax scanty, sordid white; head rather elongated, with prominent clypeus, which is shining, with large sparse punctures; supraclypeal area and sides and lower part of front shining, the front extremely densely and finely punctured; mesothorax and scutellum polished, with fine rather sparse punctures; area of metathorax very finely wrinkled, its posterior margin prominent, obtuse, shining; posterior truncation shining, concave in lateral view; tegulae black with a brown spot; wings hyaline, stigma and nervures reddish brown; second submarginal cell broad; legs with white hair, a red brush at end of hind basitarsus; hind spur with three large spines; abdomen shining, pruinose with dull white pubescence, but without distinct bands or hair-patches.

Longs Peak trail, Colorado, above timber line, July 20, 1919 (*Cockerell*). Differs: (*a*) from *inconditus* Ckll. by the clear wings, more shining thoracic dorsum, and shining posterior rim of metathoracic enclosure; (*b*) from *dasiphorae* Ckll. by similar characters; (*c*) from *divergens* Lovell by the dark tegulae, clear wings, etc.

Halictus glaucovirens n. sp.

♀. Like *H. pruiniformis* Crawf., but head elongated as in *H. pruinus* Rob., from which it differs by the darker flagellum, and more strongly and less densely punctured mesothorax, with a shining sparsely punctured area on each side of the middle. The insect is glaucous green, with pure white pubescence; wings hyaline, stigma pale yellowish, subcostal nervure black. The thorax is not so robust as in *pruinus*.

Longs Peak trail, above timber line, July 20, 1919 (*Cockerell*.)

Halictus hudsoniellus n. sp.

♀. Length about 5 mm.; slender, with unusually pointed abdomen; head and thorax olive-green, the scutellum and mesopleura more glaucous green; labrum and apical half of mandibles red; flagellum strongly reddened except at base; pubescence pure white; legs black, with the knees, tibiae at apex and the tarsi reddened; tegulae yellowish testaceous; wings hyaline, stigma and nervures testaceous, subcostal nervure black; abdomen apricot-color, shining, the third and following segments pruinose with white hair. Head subcircular; front shining; mesothorax dullish, finely punctured; scutellum shining; area of metathorax appearing minutely granular, but under compound microscope showing irregular vermiform anastomosing raised lines; the mesothorax posteriorly is more or less (microscopically) transversely sulcate; hind spur with four large spines.

Longs Peak trail, Hudsonian Zone, July 22 (*Cockerell*). The altitude of the locality is probably about 10,500 feet.

Related to *H. scrophulariae* Ckll., but smaller, and easily separated by the red labrum, much redder antennae, abdomen more hairy on apical parts with the surface of fourth and fifth segments darkened under the hair. From *H. clematisellus* Ckll. it is known by the much more hairy abdomen. The head is not nearly so broad as in *H. clarissimus* Ellis.

Halictus sp. L. P. T., 1 ♂, at *Senecio* (*W. P. C.*). An undescribed male which I cannot clearly associate with any known female; it is perhaps a new species. It is a small *Chloralictus* with olive-green mesothorax, black abdomen, and pale testaceous stigma.

Halictus viridatulus n. sp.

♀. Like *H. viridatus* Lovell, with the same highly characteristic radiating plicae on area of metathorax, though these are not quite so strong. It differs from *H. viridatus* by the dusky stigma and entirely

black abdomen. The antennae are only slightly reddish beneath toward apex. Supraclypeal area and upper part of clypeus brassy; front blue-green, dullish, very densely punctured, its lower part microscopically transversely lineolate; mesothorax and scutellum dullish rather dark blue-green; pleura dark blue-green; tegulae piceous; wings dusky; stigma and nervures dilute brownish; hind spur with large spines; abdomen polished; second segment with thin white hair at sides and base; third and following segments thinly hairy all over.

Longs Peak Inn, Colorado, July 19 (*Cockerell*). Also one on July 21. A western mountain representative of *H. viridatus*. The sculpture of the metathoracic area separates it at once from the superficially similar *H. ruidosensis* Ckll. In the second specimen the upper part of clypeus and supraclypeal area are not brassy.

PANURGIDAE.

Halictoides maurus Cress. H., 1 ♂.

Halictoides harveyi Ckll. L. P. T., 1 ♂ at *Potentilla*. L., 1 ♂.

Panurginus cressoniellus calochorti Ckll. T. S., 1 ♂, 1 ♀. L., 8 ♂, 7 ♀.

Panurginus bakeri Ckll. H., 1 ♂, 1 ♀.

Panurginus porterae Ckll. L., 1 ♂ (*H. P. C.*).

NOMADIDAE.

Nomada fontis Ckll. L., 1 ♀, July 19 (*H. P. C.*). Evidently this species, but possibly a local (mountain) race, as it differs from the type by the blacker abdominal bands, larger yellow mark on sides of second segment, and pair of subdorsal yellow spots on fourth and fifth segments.

Nomada (*Phor*) *siccorum* n. sp.

♂. Length nearly 7 mm.; head, thorax and abdomen black, with creamy-white markings; pubescence very scanty, white, tinged with brown on thorax above; head broader than long; eyes gray; face with appressed silvery hair; labrum, mandibles except apically, narrowly interrupted band on lower margin of clypeus, lower corners of face with linear extension upward, and the swollen scape anteriorly, all yellowish-white; flagellum black or nearly so above, ferruginous beneath; third antennal joint much shorter than fourth; mesothorax dull, rugosopunctate, wholly black; tubercles with a light spot; mesopleura with a transverse white mark anteriorly; scutellum (which is not prominent) and metathorax wholly black; tegulae bright ferruginous; wings slightly dusky, strongly so on apical margin; stigma dull rufous, nervures fuscous; basal nervure meeting transversomedial;

first recurrent nervure joining middle of second submarginal cell; legs ferruginous, black at base, and variably black posteriorly, the hind pair strongly so; fore and middle tibiae with a white dot at base and larger spot apically; hind tibiae with a large white mark at each end, the interval between blackened; abdomen brown-black, the first four segments with interrupted cream-colored bands, that on second extremely broad, the fifth and sixth with entire bands, bands on second and third segments emarginate on each side posteriorly, the next two enclosing black spots; apical plate narrow, entire; venter reddish marked with white.

Longs Peak Inn, in a dry sandy spot, July 21 (*Cockerell*). Quite distinct from the other species of *Phor*. Among Cresson's species of *Nomada*, it suggests *N. gracilis*, but that has the apical plate of abdomen notched and the abdomen is differently marked. In my table of Rocky Mountain species it runs to *N. aquilarum*, which differs in the antennae, etc.

Nomada sedae n. sp.

♀. Length nearly 9 mm.; head, thorax and legs ferruginous, marked with black, the only yellow being a spot on each side near apex of metathorax; head broad; eyes very dark reddish; mandibles simple; disc of clypeus extremely finely punctured; lower middle of front, region of ocelli, and cheeks posteriorly, black; antennae red above and below; third joint fully as long as fourth, perhaps a little longer; mesothorax closely punctured, with a single median black band; metathorax with a broad median black band; mesopleura red, but sides of thorax black anteriorly and posteriorly; tegulae yellowish-ferruginous; wings dusky, with the usual hyaline area; stigma clear ferruginous, nervures fuscous; basal nervures going a short distance basad of transversomedial; second submarginal cell very large, receiving recurrent nervure in middle; legs red, fore and middle femora with a large black basal spot beneath, hind coxae black behind except at apex, hind femora rather extensively blackened at base and behind; abdomen red, shining, the first segment with more than basal half black, and four minute obscure yellowish spots along the margin of the black; apex of first segment, and second and third subapically, with blackish bands; second and third segments with very broad but broadly interrupted bright yellow bands; fourth with an entire band deeply emarginate posteriorly at sides; fifth with a band interrupted on each side, leaving a round lateral yellow spot; margin of fifth with a band of dense silvery white tomentum; pygidial plate very large, thinly hairy; venter red without yellow markings.

Longs Peak Inn, July 21, at flowers of *Sedum stenopetalum* (W. P. Cockerell). Runs in the Rocky Mountain key (Bull. 94, Colo. Agr. Exper. Station) to 65, but is quite distinct from *N. libata*, *coloradensis* or *mera*. On account of the structure of the antennae it falls near *N. alpha* Ckll., from which it is easily known by the markings.

MELECTIDAE.

Phileremus americanus Cress. H., 1 ♂.

ANTHOPHORIDAE.

Anthophora smithii Cress. L., 1 ♂. This differs from the New Mexico race (*cardui* Ckll.) by having the clypeus, etc., clear white (cream-color in *cardui*), and the eyes purplish-gray (pale green in *cardui*).

Clisodon terminalis Cress. L., 2 ♀. T. S., 1 ♀. L. P. T., 1 ♀.

Melissodes kelloggi n. sp.

♂. Length about 9 mm. Runs in my table of *Melissodes* (Trans. Am. Ent. Soc., xxxii, p. 76) to *M. rivalis* Cress., but is smaller and otherwise different. The general aspect is that of *M. agilis* Cress., but it is readily distinguished by the dark purplish or blue-green (not pale green or pea-green) eyes, the entirely black labrum and base of mandibles, the darker antennae (flagellum black above) and the dark fuscous nervures. Compared with *subagilis* Ckll., it is at once distinguished by the color of eyes and antennae. The thorax has very pale ochreous tinted hair, with no dark hairs on the dorsum.

Longs Peak Inn, July 19 and 21 (*T. D. A. and W. P. Cockerell*). 5 ♂. Dedicated to Professor Vernon Kellogg, in recent years distinguished for his great services to humanity, but long ago a keen collector and student of the insects of the Long's Peak region.

MEGACHILIDAE.

Coelioxys ribis Ckll. L., 1 ♀ (*W. P. C.*).

Coelioxys moesta Cress. L. P. T., at *Senecio*, 1 ♀ (*W. P. C.*).

Megachile montivaga Cress. L. P. T., at *Phacelia*, 1 ♂ (*W. P. C.*). L., 3 ♂.

Megachile pugnata Say. H., 1 ♂. L., 1 ♀, 1 ♂.

Megachile wootoni Ckll. T. L., 2 ♂ above timber line, one ♀ at *Pentstemon stenosepalus*, at timber line (*W. P. C.*). T. S., fls. *Campanula*, 1 ♂.

Megachile vidua Smith. L., 1 ♂.

Monumetha albifrons Kirby. L., 2 ♀, 1 ♂ (one ♀ at *Astragalus*). T. S., 1 ♀, 2 ♂.

Osmia armaticeps Cress. L., 2, one at *Gaillardia*. L. P. T., 2 (one at *Arnica*). All the numerous specimens of *Osmia* taken, representing eight species, were females.

Osmia fulgida Cress. T. S., 1 (*W. P. C.*).

Osmia megacephala Cress. T. S., 1 at *Cirsium*. L. P. T., one at *Thermopsis* (*W. P. C.*).

Osmia pentstemonis Ckll. H., 1. T. L., 2 at *Pentstemon stenosepalus* (*W. P. C.*). L., 2 (one at *Astragalus*).

Osmia longula Cress. L., 2 at *Astragalus*.

Osmia wardiana Ckll. L., 1.

Osmia densa Cress. L., 3 at *Astragalus*. T. S., 2 at *Cirsium*.

Osmia albolateralis Ckll. L., 6 (5 at *Astragalus*).

Anthidium tenuiflorae Ckll. L., 2 ♀, 1 ♂.

BOMBIDAE.

All the specimens taken were workers.

Bombus mixtus Cress. B., 1.

Bombus edwardsii bifarius Cress. T. L., 2 (one at *Elephantella*, *W. P. C.*).

Bombus flavifrons Cress. H., 2.

Total 57 species; 9 new. The types of the latter are in the writer's collection.

Variation in Color Pattern of the Dragonfly *Gomphus crassus* (Odonata).

By E. B. WILLIAMSON, Bluffton, Indiana.

"Walsh's remark (Proc. Ent. Soc. Phila. II, p. 239, 1863) that the Illinois species of *Gomphus* seem to have the appendages of the males 'nearly as uniform as a set of castings from the same foundry and the same mould' seems to hold true for these three species, (*fraternus*, *externus*, *crassus*) but his statement as to the specific value of minute differences of coloration and its constancy must evidently be modified in view of the variations above detailed."—Calvert, Ent. News, XII, pp. 72 and 73, March, 1901.

In ENTOMOLOGICAL NEWS, May, 1906, p. 148, I mentioned specimens of *Gomphus* which were intermediate between *crassus* and *fraternus*. At that time I still thought of *fraternus* as a species with the dorsum of abdominal segment 9 black and of *crassus* as a species with the dorsum of the same segment with a yellow spot or bar. Moreover, at that time I did